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09/777,139	02/05/2001	Gregory Hagan Moulton	UND004	5504

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EXAMINER

ZAND, KAMBIZ

ART UNIT PAPER NUMBER

2132

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/777,139

Applicant(s)

MOULTON ET AL.

Examiner

Kambiz Zand

Art Unit

2132

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

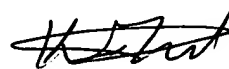
**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this section can be found in the prior office action.
2. The prior office actions are incorporated herein by reference. In particular, the observations with respect to claim language, and response to previously presented arguments.
3. Claim 3 has been cancelled.
4. Claims 1 and 28 have been amended.
5. Claims 1-36 are pending.

### ***Response to Arguments***

6. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102***

7. **Claims 1, 3, 4, 6-13, 17-25, 28-36** are rejected under 35 U.S.C. 102(e) as being anticipated by Burning, III et al (2002/0035667 A1).

**As per claims 1, 10 and 22** Burning, III et al (2002/0035667 A1) teach a data storage system comprising: a plurality of storage nodes; data storage mechanisms implemented in each storage node; a communication medium linking storage nodes; and a data

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distributed across a selected set of the storage nodes such that the data remains available irrespective of the unavailability of one or more of the storage nodes within the selected set (see abstract; fig.1-2 and associated text; paragraph 0013-0024 where data remains available regardless of failure or unavailability of a storage node), wherein the data storage mechanisms on at least two storage nodes collectively implement a unitary volume of network storage (see paragraph 0005 and 0007).

**As per claim 3** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 1 wherein the communication medium comprises: a public network for receiving access requests for the data storage system; and a private network enabling communication between storage nodes (see fig.2 and associated text; paragraph 0022 where the internet corresponds to applicant's public network).

**As per claim 4** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 3 wherein the public network comprises the Internet (see paragraph 0022).

**As per claim 6** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 1 further comprising: communication processes implemented within each of the storage nodes operable to exchange state information between at least some of the other data storage nodes (see paragraph 0018 and 0019).

**As per claim 7** Burning, III et al (2002/0035667 A1) teach the data storage system of

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claim 1 wherein each of the data storage nodes further comprises data structures configured to store state information about one or more other nodes and the communication links between them (see paragraph 0019 where the regeneration of the data stored on the failing disk corresponds to applicant's stored state information).

**As per claim 8** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 7 wherein the state information comprises information selected from the group consisting of but not limited to: availability information, capacity information, quality of service information, performance information, geographical location information, network topological location information (see paragraph 0014 and 0018).

**As per claim 9** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 8 wherein the set of storage nodes is selected by a first of the storage nodes using the state information stored in the first of the storage nodes (see paragraph 0018 and 0019).

**As per claim 11** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 1 wherein the network comprises: a plurality of first level networks, each first level network coupling multiple storage nodes; and a second level network coupling at least two of the first level networks (see fig.2 and associated text; paragraph 0022).

**As per claim 12** Burning, III et al (2002/0035667 A1) teach the data storage system of

claim 11 wherein the first level network comprises a connection selected from the group consisting of: Ethernet, fast Ethernet, gigabit Ethernet, Fiber channel, ATM, firewire, Myernet, SCSI, serial, parallel, universal serial bus, and wireless networks (see paragraph 0018 and paragraph 0022).

**As per claim 13** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 1 further comprising: storage management processes executing on one of the storage nodes to determine state information about each of the set of storage nodes (see fig.2 and associated text).

**As per claims 17, 23 and 24** Burning, III et al (2002/0035667 A1) teach a method of managing data storage in a network comprising multiple storage nodes, the method comprising the acts of: communicating a storage request to at least one storage node; and causing the at least one storage node to implement the storage request using an arbitrary subset of the storage nodes (see abstract; fig.1-2 and associated text; paragraph 0013-0024 where data remains available regardless of failure or unavailability of a storage node).

**As per claim 18** Burning, III et al (2002/0035667 A1) teach the method of claim 17 further comprising: communicating state information between the multiple storage nodes; and selecting the arbitrary subset of the multiple storage nodes to be used based upon the state information (see paragraph 0018 and 0019).

**As per claim 19** Burning, III et al (2002/0035667 A1) teach the method of claim 17 wherein the act of implementing the storage request comprises associating error checking and correcting (ECC) code with storage request (see paragraph 0018 where the failure corresponds to error checking and replacing the data from the fail disk corresponds to correcting).

**As per claim 20** Burning, III et al (2002/0035667 A1) teach the method of claim 19 wherein the ECC code is stored in a single network storage node and the unit of data is stored in two or more network storage nodes (see paragraph 0018 and 0019).

**As per claim 21** Burning, III et al (2002/0035667 A1) teach the method of claim 17 further comprising: retrieving a stored unit of data specified by the storage request; and verifying the correctness of the stored unit of data; upon detection of an error in the retrieved unit of data, retrieving the correct unit of data using data stored in the others of the arbitrary subset of the multiple storage nodes (see paragraph 0018 and 0019).

**As per claim 25** Burning, III et al (2002/0035667 A1) teach the method of claim 17 further comprising moving the stored unit of data from one network storage node to another network storage node after the step of storing (see paragraph 0018; fig.2 and associated text).

**As per claim 28** Burning, III et al (2002/0035667 A1) teach a data storage system comprising: a peer-to-peer network of three or more of storage devices, each storage device having means for communicating state information with other storage devices, at least one storage device comprising means for receiving storage requests from external entities, and at least one storage device comprising means for causing read and write operations to be performed on others of the storage devices (see abstract; fig.1-2 and associated text; paragraph 0013-0024 where data remains available regardless of failure or unavailability of a storage node whether external or internal entities and where in paragraph 0018 disclose at least six storage devices).

**As per claim 29** Burning, III et al (2002/0035667 A1) teach the system of claim 28 wherein each of the storage devices comprises means for causing read and write operations to be performed on others of the storage devices (see fig.2 and associated text).

**As per claim 30** Burning, III et al (2002/0035667 A1) teach the system of claim 28 wherein each of the storage devices comprises data structures defined to configure at least two geographically distant ones of the data storage devices as a unitary volume of storage (see paragraph 0022 where remote corresponds to applicant's geographically distance; fig.2 and associated text).

**As per claim 31** Burning, III et al (2002/0035667 A1) teach the system of claim 30



further comprising: a network coupling to each of the data storage devices; and a storage controller coupled to the network for logically combining the at least two data storage devices into a single logical storage device (see paragraph 0014 and 0020).

**As per claim 32** Burning, III et al (2002/0035667 A1) teach a distributed data storage array comprising: a plurality of network connected storage nodes; a network interface within each storage node for receiving data and control information from other storage nodes; a network interface within at least one storage node for receiving data storage access requests from external sources; and storage management processes within the at least one storage node operable to distribute data storage for a logically contiguous quantity of data across multiple storage nodes (see abstract; fig.1-2 and associated text; paragraph 0013-0024 where data remains available regardless of failure or unavailability of a storage node).

**As per claim 33** Burning, III et al (2002/0035667 A1) teach a data storage system implemented on top of a plurality of networked computer systems and a communication network, wherein each of the networked computer systems implements a storage node and comprises: a processor for processing data according to program instructions; a network interface coupled to the processor and the network for communicating data with external entities, including other storage nodes, across the network; memory coupled to the processor, the memory comprising storage space configured to store data and instructions used by the processor; one or more mass storage devices coupled to the

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processor; a communication process comprising program instructions executing in the storage node and in communication with the network interface to provide an interface to communicate data storage access requests and responses with the external entities; storage management processes comprising program instructions executing in the storage node and responsive to the received data storage access requests and in communication with the network interface to distribute and coordinate data storage operations with external storage nodes (see abstract; fig.1-2 and associated text; paragraph 0013-0024 where data remains available regardless of failure or unavailability of a storage node).

**As per claim 34** Burning, III et al (2002/0035667 A1) teach the system of claim 33 wherein the storage management processes include processes that communicate with the external storage nodes to provide fault-tolerant distribution of data across the a plurality of storage (see paragraph 0018 and 0019;abstract; paragraph 0022).

**As per claim 35** Burning, III et al (2002/0035667 A1) teach the system of claim 33 wherein the storage management processes include processes for distributing data redundantly to protect against faults that make one or more storage nodes unavailable (see abstract; paragraph 0019-0023).

**As per claim 36** Burning, III et al (2002/0035667 A1) teach the system of claim 33 wherein the storage management processes includes fault recovery processes, wherein

the fault recovery processes respond to a fault condition by communicating with at least one of the external storage nodes to make available a set of data that would otherwise be unavailable as a result of the fault condition (see paragraph 0018-0022).

***Claim Rejections - 35 USC § 103***

8. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Burning, III et al (2002/0035667 A1) in view of Laursen et al (5,805,804 A).

**As per claim 5** Burning, III et al (2002/0035667 A1) teach the data storage system having a private network having IP (internet capabilities) as applied to claim 1, 3 and 4 above but do not disclose wherein the private network comprises a virtual private network implemented over the Internet. However Laursen et al (5,805,804 A) disclose a virtual private network implemented over the Internet (see fig.2 and associated text). It would have been obvious to one of ordinary skilled in the art at the time the invention was made to utilize Laursen's virtual private network over internet in Burning, III et al's storage site failover capability in order to provide a distributed client-server computing and access to the data over asymmetric real-time networks.

9. **Claims 14-16 and 26-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Burning, III et al (2002/0035667 A1) in view of Dugan et al (6,779,030 B1).

**As per claims 14-16 and 26-27** Burning, III et al (2002/0035667 A1) teach the data storage system of claim 1 as applied above but do not disclose explicitly wherein the communication medium comprises a secure communication medium, implementing an authentication protocol between linked storage nodes and cryptographic security between linked storage nodes. However Dugan et al (6,779,030 B1) disclose wherein the communication medium comprises a secure communication medium (see col.64, lines 54-60), implementing an authentication protocol between linked storage nodes and cryptographic security between linked storage nodes (see col.74, lines 31-35). It would have been obvious to one of ordinary skilled in the art at the time the invention was made to utilize Dugan's secure cryptographic process in Burning, III et al's storage system in order to provide content privacy such as voice privacy (see col.74, line 33-34).

### **Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: see enclosed PTO-892.
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kambiz Zand whose telephone number is (571) 272-3811. The examiner can normally be reached on Monday-Thursday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on (571) 272-3799. The fax phone numbers for the organization where this application or proceeding is assigned as (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kambiz Zand

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